

We claim:

1. A wheel suspension system for a vehicle having a body supported on a set of wheels each provided with a rim and an axle, comprising:
 - a lower control arm pivotally connectable to a first portion of said body;
 - an upper control arm pivotally connectable to a second portion of said body;
 - a roller bearing having inner and outer races, disposed within said rim, coaxially relative to the rotational axis of said rim;
 - a steering knuckle mounted on the outer race of said bearing, having a first portion pivotally connected to said lower control arm and a second portion pivotally connected to said upper control arm, defining a steering axis intersecting said rotational axis; and
 - a hub member mounted on said inner race and connectable to an axle receivable through an opening provided in said steering knuckle.
2. A system according to claim 1 wherein said bearing is provided with a set of cylindrical rollers.
3. A system according to claim 2 wherein said bearing is provided with raceways in inner and outer annular portions thereof which are inclined at an angle of 45° relative to the axis of said bearing, between which said cylindrical rollers are alternately oriented 90° relative to each other.
4. A system according to claim 1 wherein said steering knuckle is provided with an arm operatively connected to a steering system provided on said body.
5. A system according to claim 1 wherein at least a portion of said steering axis is disposed within said rim.
6. A system according to claim 5 wherein a lower portion of said steering axis is disposed within said rim.
7. A system according to claim 1 wherein said steering axis is inclined at an angle in the range of 7° to 9° relative to the vertical.
8. A system according to claim 1 wherein the connections of said steering knuckle to said upper and lower control arms comprise ball joint connections and wherein said steering axis intersects the centers of the ball portions thereof.

9. A system according to claim 1 wherein said upper control arm and said steering knuckle include a passageway intercommunicating a source of an pressure disposed on said body and a passageway disposed in said rim communicable with a tire mounted on said rim.

10. A system according to claim 9 including a set of seals are disposed between said steering axle and said rim for sealing said passageway therebetween.

11. A system according to claim 1 wherein said lower control arm comprises a panel.

12. A system according to claim 11 wherein said panel has a triangular configuration.

13. A system according to claim 11 wherein said panel has a curved bottom surface.

14. A system according to claim 1 including a spring interposed between said upper control arm and said body.

15. A system according to claim 14 including a shock absorber cooperable with said spring.

16. A system according to claim 1 including an air spring disposed between said upper control arm and said body.

17. A system according to claim 16 including a bracket connected to said upper control arm, and wherein said air spring is disposed between said bracket and said vehicle body.

18. A system according to claim 17 including a shock absorber having an end connected to said bracket and an opposite end thereof connected to an upper, movable plate portion of said air spring.

19. A system according to claim 18 wherein said bracket includes a portion providing a platform disposed between said rim and a surface of a wheel well of said vehicle, and said air spring is disposed between said platform and said wheel well surface.

20. An assembly for a vehicle having a body supported on a set of wheels each having an upper control arm, comprising:

a bracket pivotally connectable at a lower end thereof to said upper control arm and a portion at an upper end providing a platform;

an air spring mounted on said platform and connectable to a surface of a wheel well of said vehicle;

a shock absorber having a lower end connected to said bracket and an upper end connectable to an upper movable plate portion of said spring; and

at least one guide means interconnecting said bracket and a movable member of said shock absorber.

21. An assembly according to claim 20 wherein said guide means comprises a telescopic member.

22. An assembly according to claim 20 including means for providing regulated amounts of air to said spring to correspondingly vary the displacement of said body relative to said wheels.

23. A wheel assembly for a vehicle having a body, a power plant and a drivetrain for transmitting drive to said wheel assembly, comprising:

a wheel including rim and hub portions;

a roller bearing having inner and outer races, disposed within said rim portion of said wheels, coaxially therewith;

first support means mounted on said outer race of said bearing connectable to said body;

second support means mounted to said inner race of said bearing and rigidly secured to said hub portion of said wheel; and

an axle operatively connected at an inner end thereof to a portion of said drivetrain and an outer end extending into the inner race of said bearing and connected to one of said second support means and said hub portion of said vehicle.

24. An assembly according to claim 23 wherein said bearing is provided with a set of cylindrical rollers.

25. An assembly according to claim 23 wherein said bearing is provided with raceways in inner and outer annular portions thereof which are inclined at an angle of 45° relative to the axis of said bearing, between which said cylindrical rollers are alternately oriented 90° relative to each other.

26. An assembly according to claim 23 wherein said axle includes a universal joint adjacent the outer end thereof, disposed within said rim portion of said wheel.

27. An assembly according to claim 23 wherein said axle includes a pair of universal joints adjacent the outer end thereof, at least one of which is disposed within said rim portion of said wheel.

28. An assembly according to claim 23 wherein the inner end of said axle is connected to said portion of said drivetrain with a universal connection.

29. An assembly according to claim 23 wherein said first support means includes a support member mounted on the outer race of said bearing, a lower control arm pivotally connectable at one end to a first portion of said body and pivotally connected at the other end thereof to said support member, and an upper control arm pivotally connectable to a second portion of said body and pivotally connected at the other end thereof to said support member, defining a steering axis intersecting the rotational axis of said wheel.

30. An assembly according to claim 29 wherein a portion of said steering axis is disposed within said rim portion of said wheel.

31. An assembly according to claim 30 wherein said steering axis is inclined at an angle in the range of 7° to 9° relative to the vertical.

32. An assembly according to claim 29 wherein said axle includes a universal joint adjacent the outer end thereof, disposed within the rim portion of said wheel.

33. An assembly according to claim 32 wherein said steering axis intersects the center of said universal joint.

34. An assembly according to claim 33 wherein said steering axis is inclined at an angle in the range of 7° to 9° relative to the vertical.

35. An assembly according to claim 32 wherein said axle includes a portion at the inner end thereof universally connectable to a portion of said drivetrain.

36. An assembly according to claim 29 wherein said axle includes a pair of universal joints adjacent the outer end thereof, at least one of which is disposed within the rim portion of said wheel.

37. An assembly according to claim 36 wherein a portion of said steering axis is disposed within said rim portion of said wheel.

38. An assembly according to claim 36 wherein said steering axis is inclined at an angle in the range of 7° to 9° relative to the vertical.

39. An assembly according to claim 36 wherein said steering axis intersects a midpoint between said pair of universal joints.

40. An assembly according to claim 36 wherein said axle includes a portion for universally connecting the inner end thereof to a portion of said drivetrain.

41. An assembly according to claim 29 wherein said pivotal connection of said upper and lower control arms to said support member comprise ball joint connections and wherein said steering axis intersects the centers of the ball portions thereof.

42. An assembly according to claim 23 wherein said first and second support means and said wheel include a passageway intercommunicating a source of air pressure on said body and a tire mounted on said wheel.

43. An assembly according to claim 29 wherein said lower control arm comprises a panel.

44. An assembly according to claim 43 wherein said panel has a triangular configuration.

45. An assembly according to claim 29 including a spring interposed between said upper control arm and said body.

46. An assembly according to claim 45 including a shock absorber cooperable with said air spring.

47. An assembly according to claim 29 including an air spring disposed between said upper control arm and said body.

48. An assembly according to claim 47 including a bracket pivotally connected to said upper control arm, and wherein said air spring is interposed between said bracket and said body.

49. An assembly according to claim 23 including a gearbox comprising a portion of said drivetrain, supported on said body, and wherein said axle is connected to an output shaft of said gearbox through a universal connection.

50. An assembly according to claim 49 including a disc brake operatively connected to said output shaft.

51. An assembly according to claim 49 wherein said gearbox includes longitudinally aligned input and output shafts.

52. An assembly according to claim 49 wherein said gearbox comprises a differential gear assembly.

53. An assembly according to claim 49 wherein said gearbox comprises

54. A wheel unit which may be incorporated into a body to form a vehicle comprising:

a housing connectable to components of said body;

a gearbox mounted on said housing and having an input shaft and a pair of transversely extending output shafts and each side of said housing having upper and lower control arms pivotally connected to said housing;

a first support member pivotally connected to each of said upper and lower control arms, defining a steering axis;

a roller bearing having an outer race mounted on said first support member, and an inner race;

a second support member mounted on said inner race of said bearing and connectable to the hub portion of a wheel whereby said bearing will be disposed coaxially with the rotational axis of said wheel; and

an axle having an inner end operatively connected to an output shaft of said gearbox, and an outer end extending through said bearing and connected to said second support member.

55. A wheel unit according to claim 54 wherein said gearbox includes a third output shaft aligned longitudinally relative to said shaft.

56. A wheel unit according to claim 54 including a disc brake mounted on each output shaft, adjacent a housing of said gearbox, and operatively connected to an axle.

57. A wheel unit according to claim 54 wherein said housing includes a pair of longitudinally spaced, transversely disposed structural plates and said upper and lower control arms are pivotally connected thereto.

58. A wheel unit according to claim 54 wherein an outer end portion of each of said axles includes universal joint disposable within the rim portion of a wheel when said wheel is connected to the second support member to which said axle is connected.

59. A wheel unit according to claim 58 wherein said steering axis intersects the center of said universal joint.

60. A wheel unit according to claim 54 wherein an outer portion of each of said axles includes a pair of spaced universal joints at least one of which is disposed within the rim portion of a wheel when said wheel is connected to said second support member to which said axle is connected.

61. A wheel unit according to claim 60 wherein said steering axis intersects a midpoint between said pair of universal joint.

62. A wheel unit according to claim 54 wherein each pivotal connection of a lower control arm to a first support member is disposed within the rim portion of a wheel when said wheel is connected to the second support member mounted on the same bearing as said first support member.

63. A wheel unit according to claim 54 wherein said first support member includes a steering arm.

64. A wheel unit according to claim 54 wherein each of said upper control arms, a first support member connected thereto and an adjacent second support member includes a passageway functional to intercommunicate a source of air under pressure with a wheel mounted on said adjacent second support member.

65. A wheel unit according to claim 54 wherein an inner portion of each of said axles is universally connected to an output shaft.

66. A wheel unit according to claim 54 wherein each of said lower control arms comprises a panel.